SLAPR PROTOCOL
VOLUME 2, NUMBER 2
MARCH/APRIL, 1983

FLAG

```
cmd:CONNECT WDØETZ

S.L.A.P.R. Bulletin Board   vers 1.Ø

Welcome to the SLAPR bulletin board system.
The system operator is Bill - WDØETZ

The next SLAPR meeting will be held on Monday
March 28, 1983 at the Deaconess Hospital.
The meeting will begin at 7:3Ø pm.

checking user file...
logging KØPFX to disk...

Active # of msgs 12.
You are caller # 3Ø.
Next msg # will be 14.

Please retrieve and kill the following messages left for you:
2 8 9 11

Function(B,E,R,S,K,G,W,C,U,P,X,Q (or '?' if not known)?
```

FLAG

INFO

FCS

FLAG

S.L.A.P.R. BULLETIN BOARD

IS ON THE AIR

	CONTROL	

identifies the purpose of the packet

Well folks, it appears that things are under way and that the world is coming to believe that PACKET is here to stay. Have you noted the articles and references to PACKET that have been showing up lately? There have been several that I would like to bring to your attention. You might wish to look them up if you haven't seen them yet.

Let's start with the March issue of QST. There are several things to note.

In the FM/RPT column, Stan Horzepa, WA1LOU, invites W8KOX, Tom Feeny, to describe PACKET RADIO and DIGIPEATER. Tom does a very nice job for the beginner. The column even includes a block diagram of a typical packet station. This is a good one to recommend to your friends who have been asking "What is PACKET?"

Lest you think that the ARRL isn't getting questions about digital communications, take a look at the WASHINGTON MAILBOX (again the March QST). The hypothetical questions that are typical of the ARRL's daily mail run the gammot from RTTY to ASCII to BAUDOT to AMTOR to, your right, PACKET. On page 63 a special box provides a complete listing of part 97.69 (Digital Communications) of the FCC Rules. A good idea to have it close around the operating table.

Bernie Glassmeyer, W9KDR, in his column, the AMATEUR SATELLITE PROGRAM NEWS, dedicates about one column to PACSAT. He says that G3YJO, has had preliminary conversations with Space Services, Inc. about the mutual advantage of SSI launching PACSAT. Bernie reminds us that some of the first dreams of PACSAT can be found in ORBIT magazine No. 1, March 1980, page 20. ORBIT is from the Radio Amatuer Satellite Corp.

THE WORLD ABOVE 50 MHz couldn't be left out. In the March issue Bill Tynan, W3XO, follows up on his February outline of PHASE IIIB. In the February column Bill outlines the general parameters of PHASE IIIB. Then he goes on to describe what will be required to access the new bird. In the March issue he follows with some of the enhanced uses for the new orbit. He suggests that "The Phase IIIB satellite will provide us with an opportunity for an exchange of information hitherto unavailable in the entire history of radio."

The February issue of QST also suggests that the TNC is now available as software. W4UCH/2 says, "I have written an assambly-language software program for the TRS-80 Model I microcomputer that simulates the 8273 SDLC chip, when used for synchronous packet-radio communications...The only external hardware required is an EXAR 2211 demodulator, a 1200-Hz/2200-Hz afsk generator and a port-zero decoder." (page 53)

Some of you may know that PACSAT has caused a few ripples within AMSAT. As a result the January/February issue of ORBIT carries an interview with W3IWI, AMSAT president. The four page article details the whys and wherefores of the PACSAT concept. Tom tells it all and closes with a reference to Rip's (WA2LQQ) ORBIT # 1 article, "The basis of the story was the use of AMICON channel of Phase III. But the message that digital communications had arrived in the world of Amateur Radio was the main theme. I believe it."

Well folks, for SLAPR the world of amateur radio digital communications has been opened and the SLAPR LAN is functioning on 147.555.

One last thought. To your editor it seems that we need a PACKET bibliography and a digipeater directory. SLAPR PROTOCOL offers to collect and organize any such information you send to the SLAPR PROTOCOL address. disconnect Gus, W90FZ

	LOCAL AREA NETWORK	

MONALL

Interfacing the HW-2036A to the BETA TNC board.

This was a very straight-forward task because of the HW-2036A's construction. Take off the case and follow the mike wires to the terminal strip they are connected to and connect the TNC tx audio lead to the same terminal as the mike white wire. The push-to-talk lead from the TNC goes to the terminal that has the mike red wire connected to it. And last (for the tx side) connect one of the TNC ground wires to the terminal with the black mike lead connected to it. There is no need to disconnect the mike wires from the radio unless you intend to dedicate it entirely to packet radio. The receiver audio may be taken directlY from the external speaker jack on the rear of the rig but don't forget to throw the switch (also on the rear) to the external speaker position or no audio will get to the TNC board. If you use this jack you will not be able to listen to the packets coming in but if your shack is in the bedroom, as mine is, and if your XYL dislikes ham radio, as mine does, then not being able to hear the packets is a definite plus. For my rig it was necessary to set the TXDELAY parameter to 16 to allow the VCO enough time to settle down. There are VCO mods installed in some used rigs you might run into that may not require so much time, so experiment with it.

TNC minor problems.

Now and then on power-up, all of the "PERMed" informaion will be lost and it will be necessary to throw switch one on the DIP-switch and reset with switch three and then re-input MYCALL, etc and "PERM" it again. This is annoying but not serious until the day comes when you have no "PERMS" left in your NOVRAM. I guess that means

you can only PERM 5000 times or so and then replace the NOVRAM, it is only a minor problem.

I did get to see the MF10 filter chip die before my very eyes. One minute it was working fine and the next minute it was dead. Using the supplied bypass procedure I put the board back into operation. I would like to get a new MF10 and if it also dies maybe discover the cause of death. It could be excessive audio input level or maybe even an RFI related problem, though I sort of think that the audio level is the culprit. It would be nice to supply each TNC user with one or two extra jumpers to use with the board. It's a shame to solder jumper wires on such a neat looking board, and it's easier to remove the jumpers when they don't require unsoldering.

Happy packeting and 73 from Len, KD9S.

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1983 SLAPR ROSTER

WB9FLW 001 1283
PETE EATON
35 NORSPUR, RT. 4
EDWARDSVILLE IL 62025
618-288-5432

WDOETZ 002 1283
BILL REED
13263 AMIOT DR
ST. LOUIS MO 63141
314-878-6055

KAOAYO 003 1283
ED DILLON
14942 COUNTRY RIDGE
CHESTERFIELD MO 63017
314-532-4933

W90FZ 004 1283
GUS KUETHER
1309 GLOUCESTER DR
EDWARDSVILLE IL 62025
618-656-8154

KA9AKM 005 1283
SCOTT KUETHER
1309 GLOUCESTER DR.
EDWARDSVILLE IL 62025
618-656-8154

NODZI 006 1282
JOHN ROBERTS
8219 BRADDOCK
U. CITY 63132
314-997-6936

KAOIXI 007 1283
SPENCER BRANHAM
9926 LEWIS AND CLARK B
ST LOUIS MO 63136
314-869-4761

WAOKGU 008 1283
TOM VOGEL
12 VILLE DONNA CT
HAZELWOOD MO 63042
314-739-4078

WBOTLK 009 1282
TOM NICHOLS
3334 OXFORD
ST LOUIS MO 63143
314-647-8994

WBOWRK 010 1282
TOM BRICKEY
25 FLORA
FESTUS MO 63028

KL7HSY 011 1283
RICHARD PAGENDARM
6717 CHERRYVALE
HAZELWOOD MO 63042
314-895-4218

KA9KAY 012 1282
LES WELCH
616 VALENCIA DR
BELLEVILLE IL 62223
618-538-5823

KD9S 013 1283
LEONARD PARIS
442 CARLYLE EAST
BELLVILLE IL 62221
618-277-4927

014 1282
RICHARD MARTIN
828 TESON
HAZELWOOD MO 63042
314-895-3881

1983 SLAPR ROSTER CONTINUED

KA9HNT 015 1283
MIKE PETZ
76 PASADENA
FAIRVIEW HGTS IL 62208
618-397-9754

WR9KDY 016 1283
VON DEEKE
2120 J SERENIDAD
MARYLAND HGTS MO 63043
314-434-9525

WOMKJ 017 1283
GILBERT PAULS
1214 LAKEMONT DR
ARNOLD MO 63010
314-287-3398

WBOTLM 018 1282
PAT NICHOLS
3334 OXFORD
ST LOUIS MO 63143
314-647-8994

KOKN 019 1282
RAYMOND KNEFEL
13 YORK HILLS
ST LOUIS MO 63144
314-863-6034

KAONSO 020 1283
FRANK SPAVALE
7073 SPAVALE RD
HIGH RIDGE MO 63049
314-677-3759

NODVS 021 1283
FRANK GOERINGER
8943 NEWBY AVE
ST LOUIS MO 63147
314-869-9328

NOBKH 022 1283
ERNIE STEPHENS
7018 MORGANFORD
ST LOUIS MO 63118
314-

WBOIUN 023 1282
STEVE WELTON
2624 ROSELAND TR # 13
MAPLEWOOD MO 63143
314-645-4581

K9NG 024 1283
STEVE GOODE
140 W WOOD, APT 314
PALATINE IL 60667

KA0OID 025 1282
JO SPAVALE
7073 SPAVALE DR
HIGH RIDGE MO 63049
314-667-3759

W9SKD 026 1282
F. R. GEORGE
16219 S GEORGE CT
PLAINFIELD IL 60544
815-436-5980

N9BHW 027 1283
JIM DUFFY
86 W WOODLAND
E ALTON IL 62024

WA4GWG 028 1283
BOB EWING
BOX 304
NAVESINK NJ 07752

1983 SLAPR ROSTER CONTINUED

W5TJI 029 1283
BILL ALSOPP
42 BEVERLY PL
LITTLE ROCK AR 72207

W5CAT 030 1282
CHARLES GUILLORY
44 WASHINGTON PL
EDWARDSVILLE IL 62025
618-656-7972

WB4NCQ 031 1282
CLIFF GREENE
3921 SCHILLER PL
ST LOUIS MO 63116
314-481-2633

KOPFX 032 1283
MEL WHITTEN
3219 HAAS AVE
BRIDGETON MO 63044
314-739-4122

WBOROT 033 1283
BILL SIMMONS
119 W. MORGAN ST
BOONVILLE MO 65233
816-882-5883

WB6HHV 034 1283
MIKE BROCK
10230 MEYER CIRCLE
SAN DIEGO CA 92126

W3VS 035 1282
SCOTT LOFTESNESS
20324 HIGHAND HILL
GAITHERSBURG MD 20879

NOCCZ 036 1283
ANDY FREEBORN
5222 BORREGO DR
COORADO SPRGS CO 80918

WBOIZK 037 1283
HERB BAUMGARTNER
4418 BONFIS DR
BRIDGETON MO 63044

SLAPR ROSTER
as of 3/1/83

Pease check for errors.

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MARCH MEETING
SLAPR

SLAPR invites all to hear WDOETZ, Bill, report on the Concept Design Meeting for PACSAT, held in Washington, D. C. Many interesting bits of news.

There will also me a report on the Second Computer Networking Conference held in San Francisco. Pete, WB9FLW, will do the honors on this one.

The PACSAT Project

Den Connors
PACSAT Project Manager
Radio Amateur Satellite Corporation - AMSAT

AMSAT has begun the design and development of a new form of Amateur Satellite. The PACSAT series of satellite systems has as a design goal total global access by all hams to a store-and-forward packet radio message handler.

Introduction

AMSAT is proposing the design and prototyping of a satellite-based experiment for advanced digital packet satellite communications experiments. This system, called PACSAT, will use internationally-allocated Amateur Radio Service frequencies. The PACSAT system will connect a grid of ground-based amateur radio local area networks in the United States and many other countries via a common store-and-forward packet repeater operating in the Amateur Satellite Service.

This paper details the reasons behind such a satellite. Following the design concepts, a description of the entire system is given, and a list of technical parameters for each of the defined subsystems is shown. The current outline of tasks and scheduling follows, with a description of the efforts of groups already engaged in the initial design effort.

The PACSAT Concept

The Amateur Radio communities in the United States and other countries are currently experimenting with digital networks on radio channels. These networks are using techniques already in place on the national telecommunication networks known collectively as packet networking.

Packet radio systems have a set of benefits unusual in present amateur radio systems. Large numbers of stations may share a common frequency, and use multiple access packet techniques to multiplex several sets of users in the time domain; very high spectrum utilization is accomplished by keeping all of these users on the same channel. A second benefit of the single shared channel is the ability to find all other users of the packet radio system. No searching of a wide band of frequencies is required; connectivity is maximized. The need of multiple access techniques to detect successful transmissions yields a third benefit, that of reliable transmissions. Any message that arrives at destination has had its data integrity checked. This inherent reliability may well open a series of possibilities for improving emergency traffic handling, one of amateur radio's most important aspects.

As experiments continue on ground-based packet radio local area networks, a new class of satellite is being considered to handle linking of both individual ground stations and local area networks. The PACket radio SATellite (PACSAT) system is designed to provide a store-and-forward digital repeater which is available to all groups around the world for fully global network coverage. The satellite provides this coverage by occupying a low-earth orbit (LEO), which has several benefits. The close proximity of passage,

AMSAT SATELLITE

relative to geo-synchronous satellite, allows easy access, with good "link margins". There are thousands of amateur radio earth stations that are already configured to operate on this class of satellite. Additionally, proper choice of orbital parameters allows a

sun-synchronous orbit, where passage of the satellite occurs at the same times each day, providing an easy means of scheduling transmissions. This orbit then provides both 100% global coverage and very fair access, and creates a powerful new use of a well-known class of amateur satellite.

There are several purposes for providing such a system in the Amateur Satellite Service. PACSAT will provide a wide-availability vehicle for advanced experimentation, and a prototype system for a new class of satellite service involving reliable transmission of data to remote sites and isolated users, regardless of location. Several internationally-based organizations have expressed interest in just such capabilitiies, and this gives AMSAT the oppurtunity of spear-heading a potentially major new push in low-cost satellite systems, much in consonance with the F.C.C. charter for the Amateur Radio Service as a "proving-grounds" for new technology. The Volunteers in Technical Assistance (VITA), a non-profit firm dedicated to advancing the level of technilogical expertise of less-developed countries, is actively pursuing the coordination of such vanguard activities, and is working directly with AMSAT on the PACSAT development.

Other benefits result from the use of digital techniques. Considerable improvements may be made to emergency communications, as reliable, high availability links compatible with global mobile and portable radio service requirements are provided. Additionally, a spin-off benefit for AMSAT itself is the attracting of the new, computer-aware members of the Amateur community into the Amateur Satellite Service.

A possible third set of benefits may be spun off the PACSAT system indirectly; the opportunity exists for designing new types of low-cost satellite launching and propulsion systems as a part of this next generation of Amateur spacecraft.

Such a system would provide a number of functions. In addition to the primary use as a world-wide store-and-forward link, or "flying mailbox", the PACSAT experiment could provide real-time regional linking (standard LEO amateur mode). As mentioned, both local network concentrators (gateways) and individual users could access the satellite. Finally, the system would provide the mechanism for advanced testing of network systems concepts, hardware, software and protocols to be used by packet radio networks in the future.

PACSAT System Description

PACSAT is an extraordinarily complicated system, rather similar in complexity to the Phase III spacecrafts. In addition to all of the required satellite support subsystems on board the spacecraft, there are two experimental packages, each consisting of multiple uplink channels, common downlink channels, and modems, coder/decoder link-access devices and control microprocessors with interfaces to a common satellite message processing unit (system control unit, or SCU). As if that isn't bad enough, the rigid packet environment demands structured ground stations with all of the familiar hardware (less the directional antennas, as we shall see), and perhaps several micropressors for handling both the data stream and the automatic station control functions. The age of the microprocessor is upon Amateur Radio.

To ease the burden of trying to understand the whole system, PACSAT can be broken up into subsections, each with well-defined interfaces to other sections. A description of each section or interface follows. Please note that, although the conceptual design has been finished, many design groups are hard at work coming up with the specifications for their parts of the overall system, so that nothing below can be construed to be the "final word".

Spacecraft

As mentioned, the orbit of PACSAT would be sun-synchronous, that is, appearing at the same time each day. UoSAT/OSCAR 9 has this type of orbit, and displays this property. Additionally, such an orbit guarantees at least two passes per day will be seen by ALL corners of the Earth.

The PACSAT satellite system may be broken into the spacecraft itself, and the experimental packages. The interfaces are defined to be spacecraft/ experiment and spacecraft/ground station.

Two options are available for placing PACSAT experiments into space. The possibility of riding the packages inside of a spacecraft built primarily for other purposes exists, and allows the PACSAT design team to avoid the additional complexity of designing and building all of the required subsystems. AMSAT has looked in particular at the future launch opportunities available on the Conestoga-series of launch vehicles to be provided as a commercial venture by Space Systems of America, Incorporated. SSI will be launching payloads directly into low-earth orbit, providing a mechanism for direct injection of PACSAT into its final orbit without requiring on-board propulsion systems in the satellite.

A second opportunity is more in line with AMSAT's traditional method of designing the satellite "from the ground up", and will likely provide many more opportunities for future launches. The Space Transportation System (Space Shuttle) has the option of carrying into space sets of three "Get-Away Special" canisters, or GAS cans. Although these cans have traditionally been reserved for inexpensive access for experimenters who did not require throwing their experiments into space, recent discussions with NASA have shown promise for using such a can as a launch opportunity. A satellite would be placed inside the can, with a mechanism in place to allow the Shuttle crew to remotely open the lid and push the spacecraft into the void (hopefully after opening the Shuttle bay doors).

This new opportunity has two tremendously useful aspects: GAS can opportunities are CHEAP ($10,000) and potentially plentiful. The drawbacks are the requirements of building such spacecraft as would be required to fit into the can, and providing a propulsion mechanism for altering the very low orbit into which the Shuttle would place the unit, so that a final, more stable orbit would be available. As it happens, there are active international AMSAT groups that are very excited with the possibility of providing both spacecraft and propulsion.

The University of Surrey spacecraft design team (UoSAT) has expressed an interest in continuing their advanced low-cost spacecraft design and construction projects, and view PACSAT as an excellent opportunity for using their integration expertise, and for providing a vehicle to carry other experiments of interest to their group.

The AMSAT/DL team at the University at Marburg, West Germany, has been discussing the possibility of providing an innovative spacecraft engine which would be ideal for such a craft as PACSAT - a steam engine, not unlike those first designed by Hero in ancient Greece. The mechanism for generating steam in space is not difficult, and impinging sunlight on external water tanks could provide a large part of the energy required to heat the water. Heating coils electrically powered in the area of the super-heated steam nozzles would finish the heating job. Although this concept seems a little far-fetched at first, calculations prove the amount of water required to alter the orbit of PACSAT is quite modest. Further, the ever-present problem of safety to the Shuttle crew is very much reduced by having spacecraft with extremely non-volatile fuels such as water! Gradual pushes from the steam nozzles at opposites sides of the orbit will nudge PACSAT into its final orbit, and residual water could be used to further occasionally alter the orbit to keep it in a sun-synchronous plane.

PACSAT Communications Experiment Package

Each of two packages will contain a set of uplink and downlink channels with associated analog and digital hardware. Current designs are targetted for typically four uplink channels, each dynamically configurable with respect to data rate. One high-speed downlink channel will be used to support the uplinks, and to provide control over the smart ground stations. For an excellent review of the design effort for the modulation techniques and access modes of these channels, see the paper "Modulation and Access Techniques for PACSAT" by Phil Karn, which is included in these proceedings.

Supporting these communications channels will be a series of filters, oscillators and amplifiers, along with microprocssors and buffer memory for channel control and support of link access protocols. These processors, with perhaps one or two channels per processor, will allow the demodulatiors chosen to be both adaptive in data rate and frequency agile.

The set of packages will have a common system controller and main memory unit (RAMUNIT). The software to support the higher-level protocols and application programs to be resident in the SCU will be loadable from the ground, a technique now common in the Amateur Satellite Service. A memory package in the megabyte range is being investigated.

Spacecraft/Experiment Interface

The spacecraft will provide the envvironment for PACSAT, including power, antennas and shielding from the extremes of space. A separate processor will handle the spacecraft's housekeeping functions, and separate communications channels will be available for satellite command. Standard interfaces will define the power busses as well as the digital communication between spacecraft and experiment processors, and the required telemetry and control functions.

Ground Stations

The PACSAT ground stations will be fairly complicated, requiring smart controllers to handle the requirements of frequency agility in the transmitters, and of linking, networking and presentation control.

To allow users to ease into packet radio satellites, a gradual upgrade path is to be provided for PACSAT use. A required piece of equipment will be the modem, which will include a modulator, demodulator and pass-through path for transmitter push-to-talk and frequency control. This modem will be capable of operating as a stand-alone modem attached to one of the current types of packet radio terminal node controllers (TNC).

Operation of the TNC and modem pair with a standard set of 440MHz transmitter and 2 meter receiver will allow operation at 1200 baud. Higher speed operation will require a separate RF deck, with direct access to IF strips. Speeds of up to 9600 baud are planned.

A final touch would be a custom TNC, specifically designed for this system, and allowing direct interface to other TNC's for ground-based internetwork linking.

It should also be noted that conservative link margin calculations have shown that, with modest transmitter power on board the spacecraft and standard powere available to ground stations (around 25 watts), the requirement for having directional antennas is not necessary. Simple gain verticals like 5/8th whips on 440 and 2 will probably be quite adequate, especially at lower baud rates like 1200 baud.

Spacecraft/Ground Station Interface

The PACSAT Project intends to use omnidirectional antennas on two of the most popular VHF/UHF bands, in a mode which will be familiar to Phase III users. Uplinks will be available at aroung 435 MHz, and choice of the proper channel will be made by the ground station controller, following the command requests of the satellite. The common downlink will appear at the edge of the Amateur Satellite allocations, probably around 145.806MHz for one package and 145.994 MHz for the other.

The modulation technique, synchronization requirements, encoding mode and related parameters are to be determined, based on experiments to be performed by two different design teams this spring. It is assumed that either differentially-encoded phase-shift keying or minimum shift keying at rates in the 1200 to 9600 baud range, perhaps adaptively availble, are the most likely candidates.

The link-level access protocols, that is, the addressing and error detection schemes are planned to be compatible with the AX.25 Amateur packet radio protocol standard. This protocol has already been implemented by several groups, and is a de facto AMSAT standard for all currently-planned packet satellite efforts.

The network protocol will probably support AX.25 network-level protocol, and perhaps also less complicated (and less reliable) "datagram-type" protocols as well.

The memory interface between ground stations and the on board RAMUNIT will be little more than a virtual disk drive, with a very noisy connecting link. On top of this protocol will lie an applications program which will provide a number of message and file services. Experimenters will be provided with lower-level accesses to the system where such access does not significantly disrupt normal use of the system.

PACSAT Project Status

The final conceptual review meeting was held in February 1983, and several of the design groups attended, including representatives from both VITA and the University of Surrey. Many of the more sophisticated concepts were thrown away to provide an easier target for scheduling. There will be a set of subsystem design meetings at this conference, and further meetings to be held later this spring. Negotiations are currently underway with the candidate launch agencies and design support groups.

System design is likely to be completed early this summer, with deliverable items to be integrated and tested this fall. Following critical design review meetings, spacecraft-ready subsystems will be prepared and shipped to the integrating agancy by next spring. Such a schedule would allow AMSAT to take advantage of possible launch opportunities as early as late 1984. Slippages will be inevitable however, and more realistic times will in general coincide with the more likely target launch dates, early 1985 to 1986.

The project now has the support of twelve differennt design groups from four different countries, but is still in need of qualified hardware and software designers to help review all aspects of the current design, and provide needed manpower with several of the more important subsystems. PACSAT is an all-volunteer effort, and will require careful evaluation by the general user community during its initial phases to confirm design parameters and provide guidance in the utility of the various modes. It is hoped that this system will not only provide many services which are forecast for the digital fututre of ham radio, but also create a whole new set of users and uses yet to be imagined.

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SSSSS  L        A     PPPP   RRRR
S      L       A A    P   P  R   R
SSSSS  L      AAAAA   PPPP   RRRR
    S  L      A   A   P      R  R
SSSSS  LLLLL  A   A   P      R   R


     SSSSS    A    Y   Y  SSSSS
     S       A A    Y Y   S
     SSSSS  AAAAA    Y    SSSSS
         S  A   A    Y        S
     SSSSS  A   A    Y    SSSSS


TTTTT  H   H    A    N   N  K   K  SSSSS
  T    H   H   A A   NN  N  K  K   S
  T    HHHHH  AAAAA  N N N  KKK    SSSSS
  T    H   H  A   A  N  NN  K  K       S
  T    H   H  A   A  N   N  K   K  SSSSS


     TTTTT    A    PPPP   RRRR
       T     A A   P   P  R   R
       T    AAAAA  PPPP   RRRR
       T    A   A  P      R  R
       T    A   A  P      R   R
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and all of the others who did so much to make the TNC boards a reality. A job well done. BRAVO!!!

All of us here at SLAPR want the world to know that we appreciate all that has been done to keep amateur radio in the forefront of technical advances. We want you to know that those late nights and long days have provided something of which you can be proud. To your ladies who put up with all the monkeyshines, a tip of the CARDINAL'S hat. We look forward to sharing our finds with you and all the BETA family out there.

Thanks,

de SLAPR Executive Board
and all the members.

	GATEWAY	

station to access long distance communications

February 14, 1983

Pete Eaton, WB9FLW
35 Norspur, Route 4
Edwardsville, IL 62025

Dear Pete:
Greetings from a fellow Beta Test TNC user!

I have very briefly spoken to you on two previous occasions Pete, but at both times I'm sure you were much too pre-occupied to have remembered. One was at the TAPR meeting last summer in Scottsdale at the Franciscon Renewal Center when you were busy making a video tape of the meeting for the St. Louis group and the other just about a week ago at the annual meeting in Tucson. Four of us from the Phoenix area were there and we came home the following day with four of the TNC's! Which I might add were up and running that Sunday evening. But not without some minor problems such as connecting the RS232 to the TNC. All four of us are using TRS-80's, three of us Mod I's and one Mod III. We have been generally using 1200 BAUD and also generally using a terminal program called MICRO-TERM by Micro System Software Inc. which has some nice features one of which allows going to DOS and doing other things without losing a Byte of data, and this has been useful in setting up to transfer files via the TNC. We only just accomplished that last night and only BASIC programs that were saved in ASCII.

I guess my reason in writing to you now, Pete, is to suggest that it might be useful to both groups, St. Louis and us here in the Phoenix area, if we could establish a weekly schedule on a HF band to cuss and discuss our experiences with the TNC's and attempt to answer each others's questions, etc. The December # 3 issue

of the Packet Status Register suggested meeting on Sundays at 1900Z on 21.280 Mhz. and perhaps you have already begun doing that (I didn't listen this past Sunday) but I for one will be listening there this next Sunday and if fifteen meters is bad as it has been sometimes recently, how about listening on 14.280 Mhz + or - at about 1915Z? Since I think that the St. Louis group has a bit of a head start on the rest of us I'm sure that you have some interesting findings to report even at this early stage of the Beta testing!

Thus far we have not found any defects in our boards or in the software. I think you all who were involved with the production of the boards have done a superlative job and we are looking forward to a great new adventure using them.

Very 73, Pete and would appreciate hearing from you, and will be on the lookout for you or any of the St. Louis gang on Sundays!

Charlie, W7KB
6150 E. Harvard St.
Scottsdale AZ 85257
(602)947 0296

P.S. The other three proud Phx owners are -
Frank Edwards - WB7PXR
Leon Blahnik - WB7EMN
Lynn Young - WB7IBZ

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WESTLINK REPORT for November 5, 1982 tells that WA2RYT now has a 2 meter packet repeater ready to go. It is on 146.46 simplex. He has built it around the VADCG TNC board and an ICOM 22S. The antenna is a Ringo Ranger and the software has been provided by AMRAD. Packeteers in the area of Rochester, NY are invited to check with Ray (Williams). He is reachable at 305 Barry Road, Rochester, NY 14617.

	GATEWAY	

from Tom, W3IWI to Lyle, WA7GXD

I already have some detailed feedback on board design, recommendations, tec. Assuming you are receptive, here goes:

(1) The four corner mounting holes (and possibly the center hole) should have foil from the nearby (bottom side) ground trace. Grounding the board in a metal box seems to cure 99.44% RFI problems.

(2) The XR2211 Carrier Detect line to WD1933 should be "breakable" with jumper if you ever want to run with an external modem.

(3) It would be awfully nice if the jumper mentioned under (2) + the RXD jumper + TXD jumper could be located such that they can be mated with a single ribbon-style connector.

(4) There should be off-board pads for the reset switch. When mounted in a box, the reset must be available on the panel. I jumpered SW3 and SW4 and use the SW4 pads for this function.

(5) I chose to use a DPDT relay for tx keying and swapping mike/tx audio. The only pin-post with +12vdc on it is the JP1 jumper header. It might be good to bring +12 to the radio I/O connector.

(6) In addition to being skimpy on voltage, the xfmr seems to run a lot hotter that I'd like.

(7) If you can't get 7809 or 7810 regulators easily using 7805's with a 5v zener (1N751 or 752) to lift the gnd lug up should wrk fb. Ditto the minus supply. Plan to make this change.

(8) A led on Carrier Detect line would be vy useful -- probably one of the more important indicators. 2203 has an extra stage that cud be used.

(9) Suggest that the RS-232 inputs to the TNC be pulled up to +12 thru 5.6k. This forces them true even if nothing is hooked onto the control lines. I put such resistors on the back of my board.

(10) Has anyone figured out the reset "funny"? It should come up running when powered up.

More comments later as they come to mind.

73, Tom

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from Mike, WB6HHV to Lyle, WA7GXD

I have several items for you.

1. My measurements at the input to the 2211 show that a value of 2.2k in place of the 6.8k at R35 is a reasonable value. This gave almost 1 volt peak to peak into the 2211.

2. Lynn Taylor, WB6UUT, has talked a local metal shop into building boxes for the TNCs. What is going to be built for now is a heavy grade aluminum "U" type box. It will be unfinished and not punched, but they are new and only $10.00. Shipping will have to be worked out and would add to your cost. This company would also be interested in quoting any box design that you come up with. Note, however, that the current box is designed for manufacturability and minimun cost. The box will measure 10x10x3. Let Lynn or me know if you or anyone else wants boxes.

3. People around here have found that replacing the top 10.0k resistor in the resistor pack for the MF-10 with a 47k resistor helps a lot. I don't understand the effect that this has and maybe someone there can explain it. Somehow this change seems to help boards receive.

from Mike, WB6HHV

	BETA BITS	

from LYLE, WA7GXD

A primary source of noise on the board is the 1488. It needs a bypass.

1) The 1488 bypass is needed from pin 1 to pin 7. A second bypass from pin 14 to pin 1 won't hurt a thing either! The 1488 has been known to oscillate at times, and when it does the board will either (a) not talk to the terminal, or (b) not receive packets.

2) The 79xx regulators do indeed require either a 1-10 ufd tantalum cap as a bypass or a 10-25 ufd aluminum electrolytic bypass.

3) We have tried a 10-volt 78xx regulator on two boards. One of the regulators oscillated severly The other one worked fine. We are getting another sample unit to replace the bad one--we need to verify whether the regulator is bad or the series of regulators is bad...Please note that the 78xx regulators are bypassed adequately.

4) I am told that Stancor makes a transformer that will work with the TNC, at a unit cost of about $11. If there is enough interest, we may be able to secure some at a sightly better price. This will allow the 7812 to remain on the board.

5) Be careful if you replace the 7812 with, say, a 7805 and a 4.3 volt zener. The built-in protection on the 7805 may fail. It is better to use a resistive divider, and use a current of about 20 ma "bleed" for stability. This will allow the protective circuity to operate properly.

Bypass the regulator input to output with a (normally) back-biased 1N4001 or similar if you use 50umf or more as a bypass cap. This will protect the regulator in the event of low impedance power loss on the input side.

	FLAG

identifies the beginning or the end of a packet

FAREWELL!

It is with some sadness that as of one May we will be losing one of the founding fathers of PACKET in the St. Louis area. Bill Reed, WDOETZ, will be heading south to become a Texan. I personally ran into Bill at the PACKET forum at Dayton last year and without his help and support what has been accomplished up to this point, within our small group, would not have been possible. Bill's dedication to the cause has allowed us the opportunity to "play" with a bulletin board system he developed using a computer constructed especially for that purpose. That "small feat" has allowed Bill to become part of the team developing the software for the PACKET satellite. His talent and friendship will be sorely missed. I am sure PACKET activity in Dallas will increase tremendously because of his enthusiasm. So long, Bill, and GOOD LUCK!!!

de Pete and SLAPR

As a result of Bill's departure, a talent search for a replacement is under way and will be voted on by the members at the up-coming meeting. With the election of a new vice-president another pressing matter has surfaced. With the growth and change of the organization, communications between the secretary and treasurer have become even more crucial. To this end, it has been suggested by our secretary that the two offices be combined. This would greatly simplify basic membership coordination. We hope that you will come to the next meeting ready to express your opinions.

Looking forward to seeing all of you on March 28.

disconnect WB9FLW, Pete

FMCALL

The St. Louis Packet Radio Club is comprised of individuals interestd in digital communications, especially via radio waves. Its main purpose is to stimulate the development and use of digital radio communication systems and to provide a forum for the exchange of ideas about the same.

SLAPR PROTOCOL is the official newsletter of the St. Louis area Packet Radio Club. You are invited to share and disseminate any or all on the information contained in this issue or any other. It is requested that you give credit to both the author & SLAPR PROTOCOL.

Please address all inquires to:

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ST. LOUIS AREA PACKET RADIO CLUB

Membership Application/Renewal

Mail to: Gus Kuether, Secretary
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CONCEPT DESIGN FOR PACSAT
2ND COMPUTER NETWORKING CONFERENCE
7:30 PM ON MARCH 28, 1983
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6150 OAKLAND, 40 AT HAMPTON
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